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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

KILDAY, LISA A

ART UNIT

PAPER NUMBER

2829

DATE MAILED: 05/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/775,835

Applicant(s)

YOO, WOO SIK

Examiner

Lisa A Kilday

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Claim Rejections - 35 USC § 112

Claims 1-10 amended to overcome rejections. Rejections withdrawn for the 112 ¶1 & ¶2 for claims 1-10 on the "partial pressure" issue. However, applicant should note that all gases have a partial pressure relative to the pressure of the internal environment. The partial pressure of these gases is always less than the total pressure.

Claim 14 amended to overcome 112 ¶2 rejections. Rejections withdrawn.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In independent claims 1, 11, 14, it is unclear whether the processing temperature is that of the furnace or that of the wafer. In the former case, claims 1, 11, 14 omit essential steps, such as omission amounting to a gap between the steps. See MPEP §2172.01. The omitted steps are: keeping the temperature of furnace at steady-state processing temperature while removing the wafer from the chamber. It is unclear whether the furnace remains at the steady-state processing temperature or if the wafer remains at that temperature. To apply art, the examiner assumes that the temperature is of the wafer.

Applicant's representative failed to argue and thus overcome the 112¶2 rejection. The applicant was silent on what the temperature of the furnace is. Therefore, the examiner assumes that the temperature of the furnace is of the wafer.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-21 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Wolf and Tauber, Silicon Processing for the VLSI Era, vol. 1-Process Technology: pp. 164-165, 169-178, 182-4, 194, and Wolf, vol. 2-Process Integration: pp. 331, 431, 434-5.

The processes taught by the applicant are known as LPCVD, SACVD, PECVD, and APCVD. Wolf and Tauber disclose the processing temperature (pg. 194), pressure (pg. 169), reactive (pp. 182-4, 194) and inert gases (pg. 164).

In re claims 1 & 14 (and 17, 19-21), Wolf and Tauber discloses a method for forming a thin film on a semiconductor wafer comprising: heating a process chamber to a steady-state processing temperature; loading a semiconductor wafer (pg. 174 ¶ 4, pg. 172 lines 25-26) into said process chamber; introducing a reactive gas into said process chamber at a preselected pressure (pg. 165); and unloading the semiconductor wafer from said process chamber at said processing temperature (pg. 164 ¶ 1, fig 2, pg. 174 ¶ 4, pg. 175 ¶ 2, pg. 194 table 4; Wolf: vol. 2: pg. 331 § 5.4.1.3, pg. 431 lines 1-5, pg. 434 § 6.6.2.4).

In re claim 2 with limitations of claim 1 (and 15 with limitations of 14), Wolf and Tauber disclose that the temperature is between 800-1200°C (pg. 170 lines 23-24, pg. 183 table 2 & lines 19-24, pg. 194 table 4).

In re claim 3 with limitations of claim 1, Wolf and Tauber disclose that the temperature is 200-800°C (pg. 169 3rd ¶, pg. 170 lines 23-25, pg. 183 table 2 & lines 19-24, pg. 194 table 4).

In re claim 4 with limitations of claim 1, Wolf and Tauber discloses that introducing said reactive gas includes introducing an inert gas, wherein said molecular ratio between said reactive gas and said inert gas causes said reactive gas to be at said preselected pressure (pg. 182 lines 30-36, pg. 183 table 2 & lines 19-24, pg. 194 table 4).

In re claim 5 with limitations of claims 4 and 1 (in re claim 15 with limitations of claim 14), Wolf and Tauber disclose that the pressure of the reactive gas is 0.1-760 Torr (pg. 170 lines 2-3, pg. 173 line 15, pg. 178 lines 1-20 & fig. 12).

In re claim 6 with limitations of claims 4 and 1, Wolf and Tauber discloses that the inert gases consist of Ar, He, and N₂ (pg. 164 lines 5-10, pg. 194 table 4, eqn. 10, & lines 1-21).

In re claim 7 with limitations of claim 1, Wolf and Tauber discloses that the pressure of reactive gas is 0.1-760 Torr (pg. 165 lines 9-11, pg. 169 lines 23-25, pg. 170 lines 1-3, pg. 173 lines 14-16, pg. 183 lines 19-20, pg. 184 lines 39-41, pg. 194 lines 1-5).

In re claim 8 with the limitations of claim 1, Wolf and Tauber disclose that the partial pressure of said process chamber is 0.1-760 Torr (pg. 165 lines 9-11, pg. 169 lines 23-25, pg. 170 lines 1-3, pg. 173 lines 14-16).

In re claim 9 with limitations of claim 1 (in re claim 18 with limitations of claim 14), Wolf and Tauber disclose that the reactive gas consists of O₂, NH₃, TaETO, NO, N₂O, and H₂O (pg. 183 table 2 & lines 17-32, pg. 184 lines 1-44, pg. 194 table 4 & lines 1-21; Wolf - vol. 2: pg. 434 § 6.6.2.4 - pg. 435 lines 1-19).

In re claim 10 with the limitations of claim 1, Wolf and Tauber disclose diluting said reactive gas with N₂ to reduce the pressure (pg. 164 lines 8-9).

In re claim 11, Wolf and Tauber discloses a method for forming a thin film on a wafer by heating a process chamber to a steady-state processing temperature; loading a semiconductor wafer into a chamber, said process chamber being under vacuum pressure; introducing a process gas under a pressure into said process chamber; and removing said semiconductor wafer from said process chamber while said process chamber is under vacuum pressure (pg. 164 ¶ 1, fig 2, pg. 174 ¶ 4, pg. 175 ¶ 2, pg. 194 table 4).

In re claim 12 and 13, it has been held that to be entitled to weight in method claims, the recited structure limitations therein must affect the method in a manipulative sense, and not amount to the mere claiming of a use of a particular structure. *Ex parte Pfeiffer*, 1962, C.D. 408 (1961).

Response to Arguments

Applicant's arguments filed 2/14/03 have been fully considered but they are not persuasive. Applicant's representative asserts that Wolf fails to teach, "adjusting said first partial pressure to a second partial pressure." Applicant's reasoning is wrong for the following reasons. First, Wolf discloses a reaction chamber with a mass-flow controller. Second, Wolf discloses a method that "monitor [sic] and dispense the gases." Third, Wolf discloses a mass flow meter that determines the flow point, compares to a set point value, and "**adjust flow to specified value.**" (Vol. 1: pg. 165, lines 34-40).

The method of Wolf teaches adjusting the pressure of gases in a chamber, which is inherently teaching adjusting the first partial pressure to a second partial pressure because according to Dalton's law, the total pressure exerted in a process chamber is the sum of the pressures that each gas would exert if it were alone (vol. 1 on pp. 164-5, 169). Therefore if the first partial pressure of a gas is adjusted, the remaining partial pressure of gas is adjusted.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

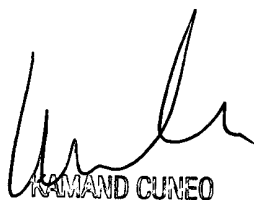
Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0957. See MPEP 203.08.

Any inquiry concerning this communication from the examiner should be directed to Lisa Kilday whose telephone number is (703) 306-5728. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo, can be reached on (703) 308-1233. The fax number for the group is (703) 305-3432. MPEP 502.01 contains instructions regarding procedures used in submitting responses by facsimile transmission.

Lisa Kilday

LAK

5/09/03


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